

[illegible]

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i) below, and  $R_A - R_E$  are independently substituents as listed in paragraph  
ii) below;

when n is 6;  $p = q = 1$ ,  $r = s = 0$ , even numbered R substituents are fluoro, chloro, or  
bromo, odd numbered R substituents are independently as listed in paragraph  
i) below, and  $R_A - R_F$  are independently substituents as listed in paragraph  
ii) below;

when n is 7;  $p = q = r = 1$ ,  $s = 0$ , even numbered R substituents are fluoro, chloro, or  
bromo, odd numbered R substituents are independently as listed in paragraph  
i) below, and  $R_A - R_G$  are independently substituents as listed in paragraph  
ii) below;

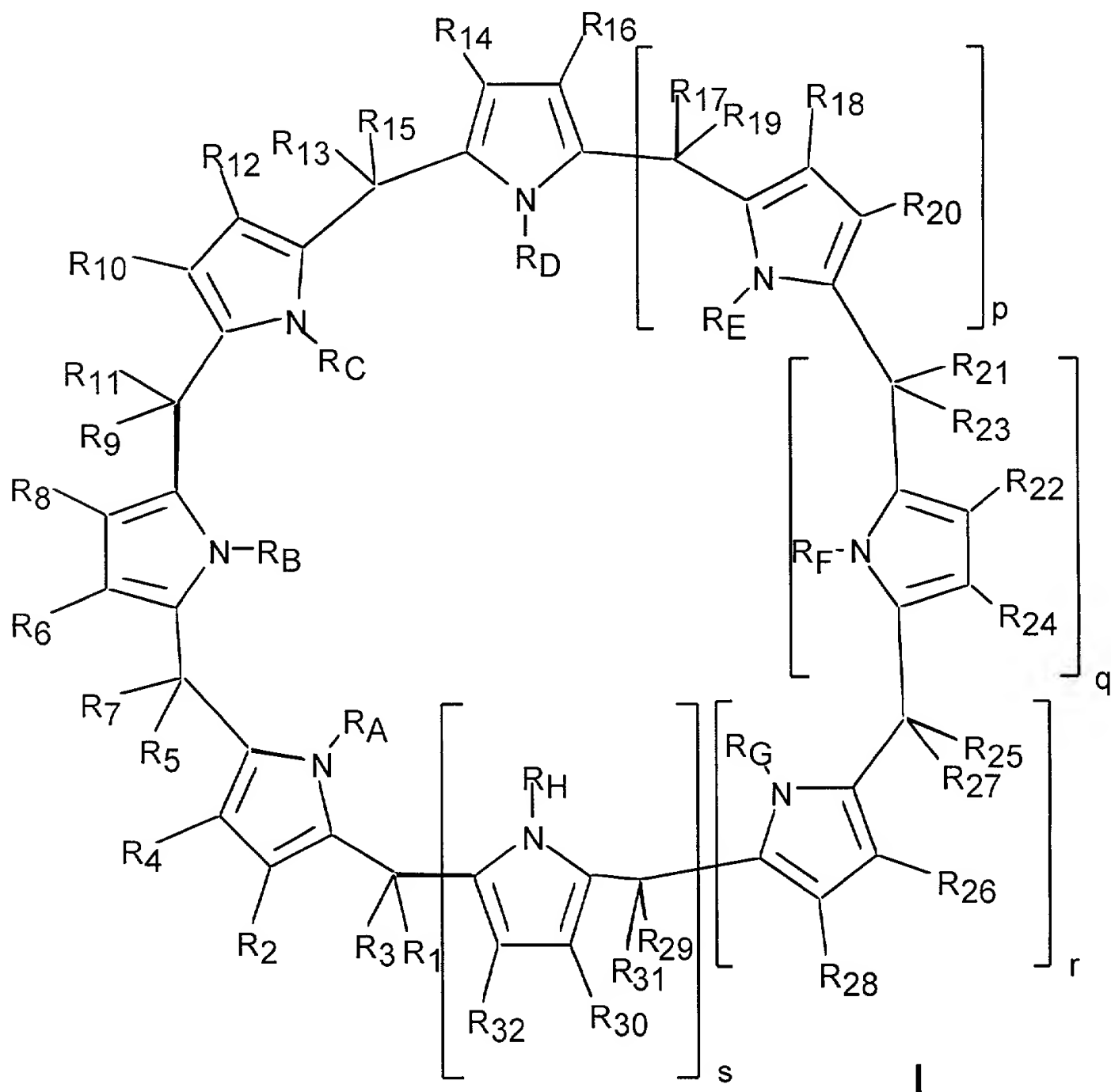
when n is 8;  $p = q = r = s = 1$ , even numbered R substituents are fluoro, chloro, or  
bromo, odd numbered R substituents are independently as listed in paragraph  
i) below, and  $R_A - R_H$  are independently substituents as listed in paragraph  
ii) below;

i) alkyl, alkenyl, alkynyl, aryl, alkylaryl, formyl, acyl, hydroxyalkyl,  
hydroxyalkoxy, hydroxyalkenyl, hydroxyalkynyl, saccharide, carboxy,  
carboxyalkyl, carboxyamide, carboxyamidealkyl, alkyl sulfoxide, alkyl  
sulfone, alkyl sulfide, tetrahydropyran, tetrahydrothiapyran, thioalkyl,  
haloalkyl, haloalkenyl, haloalkynyl, alkyl ester, a site-directing molecule, a  
catalytic group, a reporter group, a binding agent, or a couple that is coupled  
to a site-directing molecule, to a catalytic group, to a reporter group, or to a  
binding agent;

ii) hydrogen, alkyl, aminoalkyl, alkylsulfone, carboxy alkyl, carboxyamidealkyl,  
phospho alkyl, alkyl sulfoxide, alkyl sulfone, alkyl sulfide, haloalkyl, aryl,  
N-oxide, dialkylamino, carbamate, or arylsulfonyl.

2. The compound of Claim 1 wherein n is 4 and  $p = q = r = s = 0$ .

3. The compound of Claim 1 wherein at least two R substituents are coupled to form a bridged structure, the two R substituents selected from the group consisting of an odd numbered R substituent and a pyrrole R substituent, and when coupled to form a bridged structure, nonbridged substituents are as defined.
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4. A compound comprising a  $\beta$ -substituted calix[n]pyrrole macrocycle having structure I:



wherein

- 10                    n is 4; p = q = r = s = 0, even numbered R substituents are fluoro, odd numbered R substituents are alkyl, and R<sub>A</sub> - R<sub>D</sub> are hydrogen.

5. A composition comprising the compound of Claim 1 incorporated into a polymer matrix.

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anion coextractant and a cation coextractant, wherein the anion coextractant is a calix[n]pyrrole where n is 4, 5, 6, 7, or 8, and wherein the calix[n]pyrrole binds the anion and the cation coextractant binds the cation thereby allowing for removal of the ion pair from the environment.

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19. The method of Claim 18 wherein the calix[n]pyrrole is a halogenated calix[n]pyrrole.

20. The method of Claim 18 wherein the calix[n]pyrrole is a fluorinated calix[n]pyrrole.

10 21. The method of Claim 18 wherein the ion pair is an environmental pollutant.

22. The method of Claim 18 wherein the cation coextractant is a crown ether, a cryptand, a calixarene, a calixarene-crown ether cryptand, or a calixarene-crown ether conjugate.

23. The method of Claim 18 wherein the cation coextractant is a cation exchanger.

24. A method for reducing or preventing corrosion on a substrate susceptible to corrosion in the presence of a corrosion-promoting anion, comprising contacting the substrate with a calix[n]pyrrole where n is 4, 5, 6, 7, or 8 wherein the calix[n]pyrrole binds the corrosion-promoting anion, thereby reducing or preventing corrosion of the substrate.

25. The method of Claim 24 wherein the calix[n]pyrrole is a halogenated calix[n]pyrrole.

26. The method of Claim 24 wherein the calix[n]pyrrole is a fluorinated calix[n]pyrrole.

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27. The method of Claim 24 wherein the substrate is gasoline or jet fuel and the anion is a chloride anion.

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28. A method for producing a naked cation in a solution containing said cation paired with an anion, the method comprising contacting a calix[n]pyrrole where n is 4, 5, 6, 7, or 8 with the solution, wherein the calix[n]pyrrole binds the anion thereby providing the naked cation.

29. The method of Claim 18 wherein the cation is cesium.

30. A compound selected from the group consisting of compounds **44**, **46**, **48**, **50**, and **52**.